

What is claimed is:

1 1. A semiconductor device, comprising:
2 a semiconductor chip,
3 a chip-mounting substrate which is provided with said
4 semiconductor chip mounted on a top surface thereof and first
5 conductive pads formed on a bottom surface thereof and connected
6 with said semiconductor chip electrically,

7 solder balls formed on said first conductive pads,
8 a printed circuit board on which second conductive pads
9 connected with said solder balls are formed, and
10 underfill material injected into a clearance formed
11 between said chip-mounting substrate and said printed circuit
12 board,

13 wherein unevenness is formed on a surface which is brought
14 into contact with said underfill material of at least one of
15 said chip-mounting substrate and said printed circuit board.

1 2. A semiconductor device according to claim 1, wherein:
2 said unevenness is formed on said first conductive pads
3 or on said second conductive pads selectively.

1 3. A semiconductor device according to claim 1, wherein:
2 said unevenness is shaped into a slit-like configuration
3 or into a dimple-like configuration.

1 4. A semiconductor device, comprising:
2 a semiconductor chip,

3 a lead frame which is provided with said semiconductor
4 chip mounted thereon and electrically connected with said
5 semiconductor chip, and

6 a printed circuit board including third conductive pads
7 which are formed thereon and brought into contact with said lead
8 frame,

9 wherein at least one of said lead frame and said printed
10 circuit board is provided with unevennesses at contact surfaces
11 therebetween.

1 5. A method for fabricating a semiconductor device,
2 comprising the steps of:

3 forming fourth conductive pads on a bottom surface of a
4 chip-mounting substrate,

5 forming unevenness on said bottom surface of said
6 chip-mounting substrate,

7 mounting a semiconductor chip on a top surface of said
8 chip-mounting substrate,

9 connecting said semiconductor chip with said fourth
10 conductive pads electrically,

11 forming solder balls on said fourth conductive pads,

12 assembling said chip-mounting substrate into a printed
13 circuit board by connecting solder balls with fifth conductive
14 pads formed on said printed circuit board, and

15 injecting underfill material into a clearance formed
16 between said chip-mounting substrate and said printed circuit
17 board.

09093791-062901
T06290-T6290

3 said step of forming said unevenness on said surface of
4 said printed circuit board comprises the step of forming
5 unevennesses on said seventh conductive pads selectively.

1 9. A method for fabricating a semiconductor device,
2 comprising the steps of:

3 forming eighth conductive pads on a bottom surface of a
4 chip-mounting substrate,

5 forming a first unevenness on a bottom surface of said
6 chip-mounting substrate,

7 mounting a semiconductor chip on a top surface of said
8 chip-mounting substrate,

9 connecting said semiconductor chip with said eighth
10 conductive pads electrically,

11 forming solder balls on said eighth conductive pads,

12 forming a second unevenness on a surface of a printed
13 circuit board on which ninth conductive pads are formed,

14 assembling said chip-mounting substrate into said
15 printed circuit board by connecting said solder balls with said
16 ninth conductive pads, and

17 injecting underfill material into a clearance formed
18 between said chip-mounting substrate and said printed circuit
19 board.

1 10. A method for fabricating a semiconductor device
2 according to claim 9, wherein:

3 said step of forming said first unevenness comprises the
4 step of forming unevennesses on surfaces of said eighth

09093791.062501

5 conductive pads selectively, and
6 said step of forming said second unevenness comprises the
7 step of forming unevennesses on surfaces of said ninth
8 conductive pads selectively.

1 11. A method for fabricating a semiconductor device,
2 comprising the steps of:

3 forming unevennesses on predetermined parts of a lead
4 frame,

5 mounting a semiconductor chip on said lead frame,

6 connecting said semiconductor chip with said lead frame
7 electrically, and

8 assembling said lead frame on which said semiconductor
9 chip is mounted into a printed circuit board by bringing said
10 unevennesses formed on said lead frame into contact with tenth
11 conductive pads formed on said printed circuit board.

1 12. A method for fabricating a semiconductor device,
2 comprising the steps of:

3 mounting a semiconductor chip on a lead frame,

4 forming unevennesses on surfaces of eleventh conductive
5 pads formed on a printed circuit board, and

6 assembling said lead frame on which said semiconductor
7 chip is mounted into said printed circuit board by connecting
8 said lead frame with said eleventh conductive pads on which said
9 unevennesses are formed.

1 13. A method for fabricating a semiconductor device,

09893791.062901

2 comprising the steps of:
3 forming first unevennesses on predetermined parts of a
4 lead frame,
5 mounting a semiconductor chip on said lead frame,
6 connecting said semiconductor chip with said lead frame
7 electrically,
8 forming second unevennesses on surfaces of twelfth
9 conductive pads formed on a printed circuit board, and
10 assembling said lead frame on which said semiconductor
11 chip is mounted into said printed circuit board by bringing said
12 first unevennesses formed on said lead frame into contact with
13 said second unevennesses formed on said twelfth conductive
14 pads.

add 42 ➤

04063791-052901